

LAMPIRAN I

PERHITUNGAN PENGUJIAN ALAT

Tabel 5. Tabel Hasil Pengamatan

No	Volume Sampel (ml)	Pengadukan (rpm)	Suhu air (°C)		Suhu Minyak (°C)		Nilai Kalor (Joule)
			Awal	Akhir	Awal	Akhir	
1.	500	10	30	30	40	43	
2.	500	15	32	32	42	46	
3.	500	20	34	34	44	47	
4.	500	25	36	36	46	49	
5.	500	30	38	38	48	51	

Tabel 6. Tabel Hasil Perhitungan Nilai Kalor

No	Volume Sampel (ml)	Pengadukan (rpm)	Suhu air (°C)		Suhu Minyak (°C)		Nilai Kalor (Joule)
			Awal	Akhir	Awal	Akhir	
1.	500	10	30	30	40	43	4.772.250
2.	500	15	32	32	42	46	4.773.002,5
3.	500	20	34	34	44	47	4.772.250
4.	500	25	36	36	46	49	4.772.250
5.	500	30	38	38	48	51	4.772.250

1. Hasil Pengamatan

1.1. Hasil Perhitungan Nilai Kalor

Diketahui :

a) $C_p \text{ solar} = 1.750 \text{ J/Kg}^\circ\text{K}$ (*Physic Forums Diesel Properties*)

b) $C_p \text{ air} = 4.180 \text{ J/Kg}^\circ\text{K}$

c) $\rho \text{ air} = 1 \text{ gr/ml}$

d) $Q \text{ teoritis} = 4.300.000 \text{ J/L}$

- Mencari Densitas Solar

$$\begin{aligned} \rho \text{ solar} &= \frac{Q_{\text{teoritis}} \times \rho_{\text{air}}}{Q_{\text{nyata}} \times V_{\text{air}}} \\ &= \frac{4.300.000 \text{ J/L} \times 1 \text{ gr/ml}}{5000 \text{ J} \times 5 \text{ ml}} \\ &= 0,86 \text{ gr/ml} \end{aligned}$$

- Mencari Massa Air

$$\begin{aligned} \text{Massa} &= \rho \times \text{Volume air} \\ &= 1 \text{ gr/ml} \times 4.000 \text{ ml} \\ &= 4000 \text{ gram} \\ &= 4,0 \text{ Kg} \end{aligned}$$

- Mencari Massa Solar

$$\begin{aligned} \text{Massa} &= \rho \times \text{Volume solar} \\ &= 0,86 \text{ gr/ml} \times 500 \text{ ml} \\ &= 430 \text{ gram} \\ &= 0,43 \text{ Kg} \end{aligned}$$

- Perhitungan Nilai Kalor

Percobaan 1

$$Q_{\text{air}} = m \times c_p \times \Delta T$$

$$= 4,0 \text{ Kg} \times 4.180 \text{ J/Kg}^\circ\text{K} \times (30 - 30)^\circ\text{C}$$

$$= 4,0 \text{ Kg} \times 4.180 \text{ J/Kg}^\circ\text{K} \times 273^\circ\text{K}$$

$$= 4.564.560 \text{ Joule}$$

$$Q_{\text{solar}} = m \times c_p \times \Delta T$$

$$= 0,43 \text{ Kg} \times 1.750 \text{ J/Kg}^\circ\text{K} \times (43 - 40)^\circ\text{C}$$

$$= 0,43 \text{ Kg} \times 1.750 \text{ J/Kg}^\circ\text{K} \times 276^\circ\text{K}$$

$$= 207.690 \text{ Joule}$$

$$Q_{\text{reaksi}} = Q_{\text{air}} + Q_{\text{solar}}$$

$$= 4.564.560 \text{ Joule} + 207.690 \text{ Joule}$$

$$= 4.772.250 \text{ Joule}$$

Percobaan 2

$$Q_{\text{air}} = m \times c_p \times \Delta T$$

$$= 4,0 \text{ Kg} \times 4.180 \text{ J/Kg}^\circ\text{K} \times (32 - 32)^\circ\text{C}$$

$$= 4,0 \text{ Kg} \times 4.180 \text{ J/Kg}^\circ\text{K} \times 273^\circ\text{K}$$

$$= 4.564.560 \text{ Joule}$$

$$Q_{\text{solar}} = m \times c_p \times \Delta T$$

$$= 0,43 \text{ Kg} \times 1.750 \text{ J/Kg}^\circ\text{K} \times (46 - 42)^\circ\text{C}$$

$$= 0,43 \text{ Kg} \times 1.750 \text{ J/Kg}^\circ\text{K} \times 277^\circ\text{K}$$

$$= 208.442,5 \text{ Joule}$$

$$Q_{\text{reaksi}} = Q_{\text{air}} + Q_{\text{solar}}$$

$$= 4.564.560 \text{ Joule} + 208.442,5 \text{ Joule}$$

$$= 4.773.002,5 \text{ Joule}$$

Percobaan 3

$$Q_{\text{air}} = m \times c_p \times \Delta T$$

$$= 4,0 \text{ Kg} \times 4.180 \text{ J/Kg}^\circ\text{K} \times (34 - 34)^\circ\text{C}$$

$$= 4,0 \text{ Kg} \times 4.180 \text{ J/Kg}^\circ\text{K} \times 273^\circ\text{K}$$

$$= 4.564.560 \text{ Joule}$$

$$Q_{\text{solar}} = m \times c_p \times \Delta T$$

$$= 0,43 \text{ Kg} \times 1.750 \text{ J/Kg}^\circ\text{K} \times (47 - 44)^\circ\text{C}$$

$$= 0,43 \text{ Kg} \times 1.750 \text{ J/Kg}^\circ\text{K} \times 276^\circ\text{K}$$

$$= 207.690 \text{ Joule}$$

$$Q_{\text{reaksi}} = Q_{\text{air}} + Q_{\text{solar}}$$

$$= 4.564.560 \text{ Joule} + 207.690 \text{ Joule}$$

$$= 4.772.250 \text{ Joule}$$

Percobaan 4

$$Q_{\text{air}} = m \times c_p \times \Delta T$$

$$= 4,0 \text{ Kg} \times 4.180 \text{ J/Kg}^\circ\text{K} \times (36 - 36)^\circ\text{C}$$

$$= 4,0 \text{ Kg} \times 4.180 \text{ J/Kg}^\circ\text{K} \times 273^\circ\text{K}$$

$$= 4.564.560 \text{ Joule}$$

$$Q_{\text{solar}} = m \times c_p \times \Delta T$$

$$= 0,43 \text{ Kg} \times 1.750 \text{ J/Kg}^\circ\text{K} \times (49 - 46)^\circ\text{C}$$

$$= 0,43 \text{ Kg} \times 1.750 \text{ J/Kg}^\circ\text{K} \times 276^\circ\text{K}$$

$$= 207.690 \text{ Joule}$$

$$Q_{\text{reaksi}} = Q_{\text{air}} + Q_{\text{solar}}$$

$$= 4.564.560 \text{ Joule} + 207.690 \text{ Joule}$$

$$= 4.772.250 \text{ Joule}$$

Percobaan 5

$$Q_{\text{air}} = m \times c_p \times \Delta T$$

$$= 4,0 \text{ Kg} \times 4.180 \text{ J/Kg}^\circ\text{K} \times (38 - 38)^\circ\text{C}$$

$$= 4,0 \text{ Kg} \times 4.180 \text{ J/Kg}^\circ\text{K} \times 273^\circ\text{K}$$

$$\begin{aligned}\% \text{Kebenaran} &= 100\% - 11\% \\ &= 89\%\end{aligned}$$

Percobaan 3

$$\begin{aligned}\% \text{Penyimpangan} &= \frac{\left| \begin{array}{cccccccccccccccc} 22222222 & 22222222 \\ 22222222 & 22222222 \end{array} \right|}{\begin{array}{cccccccc} 22222222 \\ 22222222 \end{array}} \times 100\% \\ &= 10,98\%\end{aligned}$$

$$\begin{aligned}\% \text{Kebenaran} &= 100\% - 10,98\% \\ &= 89,02\%\end{aligned}$$

Percobaan 4

$$\begin{aligned}\% \text{Penyimpangan} &= \frac{\left| \begin{array}{cccccccccccccccc} 22222222 & 22222222 \\ 22222222 & 22222222 \end{array} \right|}{\begin{array}{cccccccc} 22222222 \\ 22222222 \end{array}} \times 100\% \\ &= 10,98\%\end{aligned}$$

$$\begin{aligned}\% \text{Kebenaran} &= 100\% - 10,98\% \\ &= 89,02\%\end{aligned}$$

Percobaan 5

$$\begin{aligned}\% \text{Penyimpangan} &= \frac{\left| \begin{array}{cccccccccccccccc} 22222222 & 22222222 \\ 22222222 & 22222222 \end{array} \right|}{\begin{array}{cccccccc} 22222222 \\ 22222222 \end{array}} \times 100\% \\ &= 10,98\%\end{aligned}$$

$$\begin{aligned}\% \text{Kebenaran} &= 100\% - 10,98\% \\ &= 89,02\%\end{aligned}$$

$$\% \text{Rata-Rata Penyimpangan} = \frac{\begin{array}{cccccccccccccccc} 22222222 & 22222222 & 22222222 & 22222222 & 22222222 & 22222222 & 22222222 & 22222222 \\ 22222222 & 22222222 & 22222222 & 22222222 & 22222222 & 22222222 & 22222222 & 22222222 \end{array}}{2} = 10,984\%$$

$$\% \text{Rata-Rata Kebenaran} = 100\% - 10,984\% = 89,016\%$$

2. Foto

